

REMARKS

1. CLAIM AMENDMENTS

Claims 1–23 were pending in the application. Claims 8, 13, 15, 17, 19–23 have been canceled without prejudice. Claims 1, 4, 6, 9–12, 14, 16 and 18 have been amended, and claims 24–26 have been added, to clarify Applicant’s claimed subject matter. Support for the claim amendments and new claims is found in the specification, *e.g.*, on p. 9, ll. 12 – p. 10, ll. 7; p. 23, ll. 22 – p. 24, ll. 6; p. 25, ll. 7 – 13; and Figures 2, 4 and 6.

No new matter has been added. Upon entry of the present amendment, claims 1–7, 9–12, 14, 16, 18 and 24–26 will be pending.

2. THE REJECTIONS UNDER 35 U.S.C. § 102 SHOULD BE WITHDRAWN

The standard for an anticipatory reference is set forth in *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631 (Fed. Cir. 1987): “[a] claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” *See also Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236 (Fed. Cir. 1989) (holding that “[t]he identical invention must be shown in as complete detail as is contained in the . . . claim”).

2.1 THE CLAIMS ARE NOT ANTICIPATED BY KAHEN

Claims 1, 4, 6, 8, 9 and 16 are rejected under 35 U.S.C. § 102(b), as allegedly being anticipated by US 6,687,274 to Kahen *et al.* (“Kahen”). Applicant traverses the rejection on the basis of the claims as amended.

The instant application provides a light-emitting device having a plurality of resonant layers, where each resonant layer includes a first reflector layer and a second reflector layer. *See* application, *e.g.*, p. 2, ll. 8–13, and p. 9, ll. 8 – p. 10, ll. 7. As recited in amended independent claims 1, 12 and 16, “each of the plurality of the resonant layers resonates light of a predetermined wavelength.” *See* application, *e.g.*, p. 2, ll. 10–11. In particular, a plurality of the resonant layers overlap in the direction in which the light is emitted from the device. For

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example, as illustrated in the exemplary embodiment of Fig. 2, the two resonant layers 31 and 32 overlap to form resonant layer 33, such that one of the reflectors of each resonant layers 31 and 32 also serves as a reflector for resonant layer 33. *See* application, *e.g.*, Fig. 2 and p. 9, ll. 8 – p. 10, ll. 7. In this exemplary embodiment, light resonated in resonant layer 33 has a different wavelength from light resonated by either of resonant layer 31 or 32. *See* application, *e.g.*, Fig. 2 and p.12, ll. 21 – p. 13, ll. 5. Accordingly, as recited in amended independent claims 1, 12 and 16, and new claim 26, “light resonated between one of the first reflector and the second reflector of one of the plurality of resonant layers and one of the first reflector and the second reflector of another of the plurality of resonant layers has a different predetermined wavelength from light resonated by one or more of the resonant layers, which light is emitted from the light-emitting device.”

Kahen does not anticipate Applicant’s claimed subject matter, because Kahen does not teach each and every element of Applicant’s claim, either expressly or inherently. The Examiner contends that Kahen teaches “a plurality of resonant layers each with a predetermined wavelengths [*sic*] (top and bottom dielectric stacks) and the top and bottom stacks each reflective over a certain range of wavelengths.” The Examiner also contends that Kahen discloses “two dielectric stacks spaced apart by layers 130 and 170.” Kahen teaches a vertical cavity laser array diode having an organic active region for producing laser light. However, Kahen’s dielectric stacks are “reflectors” that are a part of a resonant layer, and not “the resonant layer” itself, according to Applicant’s claimed subject matter. In particular, Kahen discloses an organic vertical cavity laser array device that includes a single resonant layer having a pair of reflectors, *i.e.*, top and bottom dielectric stacks 140 and 120. *See* Kahen, *e.g.*, Abstract, Fig. 1, col. 3, ll. 33–38, and col. 6, ll. 31–35. Since Kahen only teaches a single pair of reflective layers, Kahen does not teach, either expressly or inherently, Applicant’s claimed subject matter of a plurality of resonant layers, each having a first reflector layer and a second reflector layer. Furthermore, Kahen does not teach, either expressly or inherently, light resonated between one of the first reflector and the second reflector of one of the plurality of resonant layers and one of the first reflector and the second reflector of another of the plurality of resonant layers having a different predetermined wavelength from light resonated by one or more of the resonant layers. Given

that Kahen does not teach, either expressly or inherently, each and every element of Applicant's claimed subject matter, then amended independent claims 1 and 16 are not anticipated by Kahen. Applicant also respectfully submits that dependent claims 4, 6 and 9, which include the limitations of independent claim 1, are similarly not anticipated by Kahen. Claim 8 has been canceled without prejudice.

In view of the foregoing, the rejection of claims 1, 4, 6, 9 and 16 under 35 U.S.C. § 102(b) as anticipated by US 6,687,274 to Kahen *et al.* should be withdrawn.

2.2 THE CLAIMS ARE NOT ANTICIPATED BY XU

Claims 1, 3–5, 8 and 9 are rejected under 35 U.S.C. § 102(b), as allegedly being anticipated by US 5,949,187 to Xu *et al.* (“Xu”). Applicant traverses the rejection on the basis of the claims as amended.

As recited in amended independent claim 1, Applicant's light-emitting device has a plurality of resonant layers, where each resonant layer includes a first reflector layer and a second reflector layer, such that each of the plurality of the resonant layers resonates light of a predetermined wavelength. *See* application, *e.g.*, p. 2, ll. 10–11. In addition, the plurality of the resonant layers overlap in the direction in which the light is emitted from the device, such that the light resonated between one of the first reflector and the second reflector of one of the plurality of resonant layers and one of the first reflector and the second reflector of another of the plurality of resonant layers has a different predetermined wavelength from light resonated by one or more of the resonant layers.

Xu does not anticipate Applicant's claimed subject matter, because Xu does not teach each and every element of Applicant's claim, either expressly or inherently. The Examiner contends that Xu teaches “a plurality of resonant layers, each with a predetermined wavelength (defined by L2 and L3), and each wavelength being different from at least one of the other wavelengths.” As shown in Fig. 1, Xu discloses that a number of microcavities (12, 13) are positioned in tandem with the light output, and light having a desired spectrum is enhanced by each microcavity and emitted from the device. *See* Xu, *e.g.*, col. 2, ll. 40–42, col. 4, ll. 20–25 and lines 38–52. However, Xu does not teach Applicant's resonant layers that overlap in the

direction in which the light is emitted from the device, such that the light resonated between one of the first reflector and the second reflector of one of the plurality of resonant layers and one of the first reflector and the second reflector of another of the plurality of resonant layers has a different predetermined wavelength from light resonated by one or more of the resonant layers. Each of Xu's microcavity is separately tuned to emit light in a desired spectrum. In particular, none of Xu's microcavities overlaps any other microcavity in the manner of Applicant's claimed subject matter. Neither of Xu's microcavities is a part of any of the other microcavities. Applicant respectfully submits that Xu does not teach Applicant's claimed subject matter, therefore amended claim 1 is not anticipated by Xu. Applicant also respectfully submits that dependent claims 3-5 and 9, which include the limitations of independent claim 1, are similarly not anticipated by Xu. Claim 8 has been canceled without prejudice.

In view of the foregoing, the rejection of claims 1, 3-5 and 9 under 35 U.S.C. § 102(b) as anticipated by US 5,949,187 to Xu *et al.* should be withdrawn.

2.3 THE CLAIMS ARE NOT ANTICIPATED BY NAKAYAMA

Claims 1, 4, 8-13 are rejected under 35 U.S.C. § 102(b), as allegedly being anticipated by US 5,682,402 to Nakayama ("Nakayama"). Applicant traverses the rejection on the basis of the claims as amended.

As recited in amended independent claims 1 and 12, Applicant's resonant layers overlap in the direction in which the light is emitted from the device, such that the light resonated between one of the first reflector and the second reflector of one of the plurality of resonant layers and one of the first reflector and the second reflector of another of the plurality of resonant layers has a different predetermined wavelength from light resonated by one or more of the resonant layers. Furthermore, light from the plurality of resonant layers, as well as light resonated between one of the first reflector and the second reflector of one of the plurality of resonant layers and one of the first reflector and the second reflector of another of the plurality of resonant layers, is emitted from the light-emitting device.

Nakayama discloses a first and a second resonator formed on a transparent

substrate, where the light output is varied by modifying the resonance characteristics of the two resonators through external means, such as varying the voltage, pressure, temperature or magnetic force. *See* Nakayama, *e.g.*, col. 5, ll. 46–67. For example, Fig. 5a shows a light-emitting device, including the two resonators A and B, and a reflective electrode 1 of the device is a reflector of the two resonators, where the emission spectrum shown in Fig. 5(c) is obtained by combining the spectra of the two resonators shown in Figs. 5(b-1) and 5(b-2). *See* Nakayama, *e.g.*, col. 4, ll. 58–68. However, Nakayama does not teach Applicant's claimed subject matter. Applicant teaches a plurality of the resonant layers, each including a first reflector, a second reflector and a buffer layer that is in contact with the first and second reflectors. Applicant's device emits light having a predetermined wavelength that is resonated by each of the plurality of resonant layers. In addition, the plurality of the resonant layers of Applicant's device overlap in the direction in which the light is emitted from the device, such that Applicant's device also emits light that is resonated between one of the first reflector and the second reflector of one of the plurality of resonant layers and one of the first reflector and the second reflector of another of the plurality of resonant layers, which light has a different predetermined wavelength from light resonated by one or more of the resonant layers. In particular, even though fewer resonant layers overlap in Applicant's device, light having a broader range of wavelengths is resonated and emitted from the device. Accordingly, Nakayama does not teach or suggest Applicant's claimed subject matter. Applicant also respectfully submits that dependent claims 4 and 9–11, which include the limitations of independent claim 1, are similarly not anticipated by Nakayama. Claims 8 and 13 have been canceled without prejudice.

In view of the foregoing, the rejection of claims 1, 4, 9–12 under 35 U.S.C. § 102(b) as anticipated by US 5,682,402 to Nakayama should be withdrawn.

3. THE REJECTIONS UNDER 35 U.S.C. § 103 SHOULD BE WITHDRAWN

To establish a *prima facie* case of obviousness, the prior art reference must teach or suggest all the claim limitations. *M.P.E.P. 2143*. Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is a suggestion found either in the references themselves or in the knowledge generally

available to one of ordinary skill in the art. *M.P.E.P. 2143.01*.

3.1 CLAIM 2 IS NOT OBVIOUS OVER KAHEN

Claim 2 is rejected under 35 U.S.C. § 103(a), as allegedly being obvious over US 6,687,274 to Kahen *et al.* Applicant traverses the rejection on the basis of the claims as amended.

Claim 2 is not obvious over Kahen, as Kahen does not teach or suggest Applicant's claimed subject matter. In particular, Kahen discloses an organic vertical cavity laser array device that includes a single resonant layer having a pair of reflectors, *i.e.*, top and bottom dielectric stacks 140 and 120. *See* Kahen, *e.g.*, Abstract, Fig. 1, col. 3, ll. 33–38, and col. 6, ll. 31–35. Since Kahen only teaches a single pair of reflective layers, Kahen does not teach or suggest, Applicant's claimed subject matter of a plurality of resonant layers, each having a first reflector layer and a second reflector layer. Furthermore, Kahen does not teach or suggest light resonated between one of the first reflector and the second reflector of one of the plurality of resonant layers and one of the first reflector and the second reflector of another of the plurality of resonant layers having a different predetermined wavelength from light resonated by one or more of the resonant layers. Given that Kahen does not teach or suggest all of the limitations of claim 2, then claim 2 is not obvious over Kahen.

In view of the foregoing, the rejection of claim 2 under 35 U.S.C. § 103(a) as obvious over US 6,687,274 to Kahen *et al.* should be withdrawn.

3.2 CLAIM 7 IS NOT OBVIOUS OVER KAHEN IN VIEW OF YOKOYAMA

Claim 7 is rejected under 35 U.S.C. § 103(a), as allegedly being obvious over US 6,687,274 to Kahen *et al.* in view of Yokoyama US Publication No. 2001/0055084 (“Yokoyama”). Applicant traverses the rejection on the basis of the claims as amended.

Claim 7 is not obvious over Kahen in view of Yokoyama. As previously described, independent claim 1 is not obvious over Kahen. The Examiner has cited Yokoyama because Yokoyama allegedly teaches a flexible resonant layer. However, Yokoyama does not cure the deficiencies of Kahen. Yokoyama teaches a liquid crystal device comprising a chiral

smetic liquid crystal disposed together with spacer beads between a pair of substrates. Therefore, the combination of Kahen with Yokoyama does not arrive at or suggest all of the claims limitations of claim 7.

In view of the foregoing, the rejection of claim 7 under 35 U.S.C. § 103(a) as obvious over US 6,687,274 to Kahen *et al.* in view of Yokoyama US Publication No. 2001/0055084 should be withdrawn.

3.3 THE CLAIMS ARE NOT OBVIOUS OVER NAKAYAMA

Claims 14, 15, 17, 19–21 and 23 are rejected under 35 U.S.C. § 103(a), as allegedly being obvious over US 5,682,402 to Nakayama. Applicant traverses the rejection on the basis of the claims as amended. Claims 15, 17, 19–21 and 23 have been canceled without prejudice.

Claim 14 is not obvious over Nakayama. The Examiner contends that, even though Nakayama “does not expressly disclose a color filter,” it would have been obvious to one of ordinary skill in the art “to include a color filter in a liquid crystal device to allow for emission of certain colors.” However, claim 14 is not obvious over Nakayama, because Nakayama teaches away from use of color filters. In particular, Nakayama teaches eliminating color filters “that have so far been necessary” and still forming a vivid image. *See* Nakayama, *e.g.*, col. 7, ll. 10–12. Therefore, Applicant’s claim 14 is not obvious over Nakayama, because Nakayama teaches away from use of color filters with the light-emitting device.

In view of the foregoing, the rejection of claim 14 under 35 U.S.C. § 103(a) as obvious over US 5,682,402 to Nakayama should be withdrawn.

3.4 THE CLAIMS ARE NOT OBVIOUS OVER NAKAYAMA IN VIEW OF DODABALAPUR

Claims 18 and 22 are rejected under 35 U.S.C. § 103(a), as allegedly being obvious over US 5,682,402 to Nakayama in view of US 5,405,710 to Dodabalapur. Applicant traverses the rejection on the basis of the claims as amended. Claim 22 has been canceled without prejudice.

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Claim 18 is not obvious over Nakayama in view of Dodabalapur. As previously described, independent claim 12 is not anticipated by Nakayama. Similarly, Nakayama does not teach or suggest all of the limitations of independent claim 12. Nakayama does not teach or suggest Applicant's device that emits light having a predetermined wavelength that is resonated by each of the plurality of resonant layers. Furthermore, Nakayama does not teach or suggest Applicant's device comprising a plurality of the resonant layers of that overlap in the direction in which the light is emitted from the device, such that the device also emits light that is resonated between one of the first reflector and the second reflector of one of the plurality of resonant layers and one of the first reflector and the second reflector of another of the plurality of resonant layers, which light has a different predetermined wavelength from light resonated by one or more of the resonant layers. Similarly, dependent claim 18 is not obvious over Nakayama.

The Examiner has cited Dodabalapur because Dodabalapur allegedly teaches microcavities used to resonate red, green and blue light to realize a display. However, Dodabalapur does not cure the deficiencies of Nakayama. Dodabalapur is similar to Xu, in that Dodabalapur teaches a number of microcavities, each separately tuned to emit light of a desired color. Therefore, the combination of Nakayama with Dodabalapur does not arrive at or suggest all of the claims limitations of claim 18.

In view of the foregoing, the rejection of claim 18 under 35 U.S.C. § 103(a) as obvious over US 5,682,402 to Nakayama in view of US 5,405,710 to Dodabalapur should be withdrawn.

Serial No. 10/674,492
Response dated Monday, May 9, 2005
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Docket No. 5095-4068

CONCLUSION

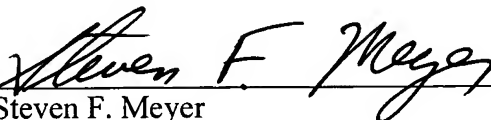
Applicant respectfully requests entry of the foregoing amendments and remarks into the file of the above-identified application. Applicant believes that each ground for rejection has been successfully overcome or obviated, and that all pending claims are in condition for allowance. Withdrawal of the Examiner's rejections, and allowance of the application, are respectfully requested.

AUTHORIZATION

No fee is believed due in connection with this response. In the event that a fee is required for consideration of this Amendment, please charge any additional fees to Deposit Account No. 13-4500, Order No. 5095-4068. A DUPLICATE OF THIS DOCUMENT IS ATTACHED.

Respectfully submitted,
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Dated: May 16, 2005

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